

Boosting Immunity in Young Pigs

Spray-dried plasma and fish oil help swine

Illness during a piglet's first few weeks of life can affect its eventual size and market-readiness. But the common practice of early weaning increases piglets' risk of disease, because their immune and digestive systems are less developed. So farmers must find ways to keep their piglets free of diseases as they grow to market size.

To help, Agricultural Research Service (ARS) animal physiologist Jeffery A. Carroll is collaborating with swine nutritionists at the University of Missouri (UM) in Columbia to look for ways to boost immunity in piglets.

"Finding ways to build immunity in young pigs has become more and more important over the last two decades because weaning age has been dramatically reduced," Carroll says.

Carroll started this collaborative research while at the Animal Physiology Research Unit in Columbia. Now at the Livestock Issues Research Unit in Lubbock, Texas, he continues to test spray-dried plasma, fish oil, and other nutritional supplements added to swine diets as a way of boosting immunity.

Spray-dried plasma is a byproduct of the meatpacking industry and is often used in swine diets to boost growth and feed efficiency. After animals are inspected and approved for human consumption, the blood is collected at packinghouses and placed into containers treated with anti-coagulant. The blood is then chilled and centrifuged to separate the plasma from the cell fraction. Individual fractions are then spray dried for use in food, feed, and industrial applications.

"The plasma protein is incorporated into the regular feed given to piglets for the first few weeks after weaning," Carroll explains. The piglets start off with a ration consisting of 5 to 7 percent plasma. After a week or so, the level of plasma in their diet is reduced to 2.5 to 3.5 percent, and eventually the piglet receives no more of the immune-protecting ingredient. By that time, their immune systems should be fairly well developed. But producers are also exploring other uses for plasma proteins in immune system responses as the pig ages and new stresses occur.

Other scientists observed that feeding piglets plasma helped to increase size and feed efficiency and speculated it helped with immunity. Carroll believes plasma provides immune protection in the pig's intestine by blocking pathogens from binding to the intestine. He has planned more tests to see why plasma boosts immunity.

Carroll and his UM colleagues are also looking at improving swine immunity by including a 7-percent mixture of menhaden

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fish oil in the diet. Like tuna and salmon, menhaden contain high levels of omega-3 fatty acids. "Fish oil builds immunity at the cellular level. It's absorbed and incorporated into the immune cells of the pig," Carroll says.

Plasma, fish oil, and other natural ingredients, Carroll says, may replace growth-promoting antibiotics that pigs have traditionally been given, especially since many countries are phasing out antibiotic use. — By **David Elstein**, formerly with ARS.

This research is part of Animal Well-Being and Stress Control Systems, an ARS National Program (#105) described on the World Wide Web at www.nps.ars.usda.gov.

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